

REC'd PCT/PTO 27 APR 2005

PATENT COOPERATION TREATY

PCT

REC'D 25 JAN 2005

WIPO PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT  
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PA133718/PCT	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/IB 03/04788	International filing date (day/month/year) 29.10.2003 ✓	Priority date (day/month/year) 29.10.2002 ✓
International Patent Classification (IPC) or both national classification and IPC C22C26/00		
Applicant ELEMENT SIX (PROPRIETARY) LIMITED et al. ✓		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 5 sheets, including this cover sheet. ✓

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 4 sheets. ✓

3. This report contains indications relating to the following items:

- I ☒ Basis of the opinion
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 26.03.2004 ✓	Date of completion of this report 20.01.2005
Name and mailing address of the International preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Alvazzi Delfrate, M Telephone No. +49 89 2399-8444 

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. **PCT/IB 03/04788**

**I. Basis of the report**

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, Pages**

1-13 as originally filed

**Claims, Numbers**

1-16 received on 17.08.2004 with letter of 17.08.2004

**Drawings, Sheets**

1/7-7/7 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. **PCT/IB 03/04788**

---

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes: Claims	8-12
	No: Claims	1, 14, 17
Inventive step (IS)	Yes: Claims	8-13
	No: Claims	1-7, 14-19
Industrial applicability (IA)	Yes: Claims	1-19
	No: Claims	

2. Citations and explanations

**see separate sheet**

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

---

International application No. PCT/IB 03/04788

The following documents have been cited:

- D1: US-A-4 525 178 (HALL DAVID R) 25 June 1985 (1985-06-25)
- D2: US-A-5 697 994 (PACKER SCOTT M ET AL) 16 December 1997 (1997-12-16)
- D3: DATABASE WPI Section Ch, Week 200170 Derwent Publications Ltd., London, GB; Class L02, AN 2001-609219 XP002269004 & JP 2001 187431 A (SUMITOMO ELECTRIC IND CO) 10 July 2001 (2001-07-10)
- D4: US-A-4 960 643 (LEMELSON JEROME H) 2 October 1990 (1990-10-02)
- D5: US-A-3316073

1. Although the wording "ultra-hard material" is common in the art, it has no generally accepted meaning (nor does the application defines the exact meaning of said wording). Accordingly, claims 1, 8, 14 and 17 using said wording do not clearly define the claimed scope and lack clarity. A possibility of clarifying said wording is to be seen in present claim 6.
2. D5 (claim 1 and column 4, line 14-49) discloses the production of pellets comprising diamond particles, a secondary abrasive such as WC and a metal binder. An organic binder such as paraffin is used to produce the pellets (column 3, line 5-6). The pellets are then compacted into a green and sintered. The green comprises carbides particles in a matrix. The matrix comprises a binder and (coarse) diamond particles. Therefore, the subject-matter of claim 1 lacks novelty in view of D5.
3. The independent claims 14 and 17 also relate to subject-matter lacking novelty in view of D5.
4. The dependent claims 2-7, 15-16, 18-19 do not appear to add anything rendering the claimed subject-matter inventive (the added features being either known from the cited documents or standard in the art).
5. None of the cited documents discloses a method for producing a coherent green wherein cores according to claim 8 are coated by the components of making an ultra-hard material and a binder. Accordingly, the subject-matter of claim 8 is novel.

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

---

International application No. PCT/IB 03/04788

The novel feature solves the problem of allowing the obtention of more reproducible properties (page 11). The available prior art is silent on the claimed solution.

**CLAIMS:**

1. A composite material comprising a plurality of cores of material selected from the group comprising carbides, nitrides, carbonitrides, cemented carbides, cemented nitrides, cemented carbonitrides and mixtures thereof, dispersed in a matrix, the matrix comprising the components for making an ultra-hard material and a suitable binder.
2. A composite material according to claim 1, wherein the components for making the ultra-hard material comprises a mass of ultra-hard abrasive particles and optionally a second phase comprising a solvent/catalyst or a precursor to a solvent catalyst, in particulate form, for the ultra-hard abrasive particles.
3. A composite material according to claim 1 or claim 2, wherein the ultra-hard material is polycrystalline in nature.
4. A composite material according to claim 3, wherein the polycrystalline ultra-hard material is PCD or PcBN.
5. A composite material according to any one of the preceding claims, wherein the cores are provided as individual particles or in the form of granules.
6. A method of producing a composite material including the steps of:
  - (i) providing a plurality of cores of material selected from a group comprising carbides, nitrides, carbonitrides, cemented carbides, cemented nitrides, cemented carbonitrides and mixtures thereof;
  - (ii) providing the components for making an ultra-hard material and a suitable binder; and

- 15 -

- (iii) consolidating the cores, components and binder to produce a composite material.
- 7. A method according to claim 6, wherein the components for making the ultra-hard material comprises a mass of ultra-hard abrasive particles and optionally a second phase comprising a solvent/catalyst or a precursor to a solvent catalyst, in particulate form, for the ultra-hard abrasive particles.
- 8. A method according to claim 6 or claim 7, wherein the ultra-hard material is polycrystalline in nature.
- 9. A method according to claim 8, wherein the polycrystalline ultra-hard material is PCD or PcBN.
- 10. A method of producing a tool component including the steps of:
  - (i) providing a substrate;
  - (ii) providing a composite material as defined in any one of claims 1 to 5;
  - (iii) placing a layer of the composite material on a surface of the substrate to produce an unbonded component; and
  - (iv) subjecting the unbonded component to conditions of elevated temperature and pressure suitable to produce an ultra-hard material.
- 11. A method of producing a tool component including the steps of:
  - (i) providing a substrate;

- 16 -

- (ii) providing a composite material as defined in any one of claims 1 to 5;
  - (iii) placing a layer of the composite material on a surface of the substrate;
  - (iv) placing a layer of the components for making an ultra-hard material on the layer of composite material to produce an unbonded component; and
  - (v) subjecting the unbonded component to conditions of elevated temperature and pressure to produce an ultra-hard material from the components.
12. A method according to claim 10 or claim 11, wherein the cores are provided as granules coated with the components for making the ultra-hard material and the binder.
13. A method according to claim 12, wherein the granules are further coated with a second coating comprising material selected from the group comprising carbides, nitrides, carbonitrides, cemented carbides, cemented nitrides, cemented carbonitrides, and mixtures thereof, or the components for making an ultra-hard material of a different grade to that of the first coating.